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Damping of liquid sloshing by foams: from everyday observations to liquid transport ALBAN SAURET, FRANCOIS BOULOGNE, JEAN CAPPELLO, HOWARD STONE, Princeton Univ — When a liquid-filled container is set in motion, the free surface of the liquid starts to slosh, i.e. oscillate. Such effects can be observed when a glass of water is handled carelessly and the fluid sloshes or even spills over the rim of the container. However, beer does not slosh as readily, which suggests that the presence of foam could be used to damp sloshing. In this work, we study experimentally the effect on sloshing of liquid foam placed on top of a liquid bath in a Hele-Shaw cell. We generate a monodisperse 2D liquid foam and track its motion. The influence of the foam on the sloshing dynamics is characterized: 2 to 3 layers of bubbles are sufficient to significantly damp the oscillations. For more than 5 layers of bubbles, the original vertical motion of the foam becomes mainly horizontal. We rationalize our experimental findings with a model that describes the foam contribution to the damping coefficient. This study motivated by everyday observations has promising applications in numerous industrial applications such as the transport of liquid in cargoes.

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